Amendment to the Claims:

1. (Original) A method for examining an object, which method includes the steps of:

a) exciting the object by means of mechanical oscillations,

b) measuring the variation in time of the excursion from the rest state of voxels of the object which are subject to the waves caused by the oscillations in the object,

c) determining the non-linear distortions from the variation in time of the excursion, and

d) evaluating the non-linear distortions.

2. (Currently Amended) A method ~~as claimed in claim 1, in which the evaluation comprises the formation of~~ for examining an object, which method includes:

a) exciting the object by means of mechanical oscillations;

b) measuring the variation in time of the excursion from the rest state of voxels of the object which are subject to the waves caused by the oscillations in the object;

c) determining a measure of the non-linear distortions from the variation in time of the excursion;

d) evaluating the non-linear distortions; and

e) reconstructing an image representing the extent of the non-linear distortions.

3. (Currently Amended) A method as claimed in claim [[2]] 1, which method includes the steps of:

a) exciting the object in an examination zone by means of temporally periodically, preferably sinusoidally varying mechanical oscillations,

b) exciting the nuclear magnetization in the object in the examination zone in conjunction with a magnetic gradient field (G1, G2) which is synchronous with the mechanical oscillations, and receiving the MR signals arising in the object in

order to form an MR phase image, the variation in time of the gradient field being chosen to be such that the MR signals are determined by excursions at the fundamental frequency as well as by excursions at at least one higher harmonic of the fundamental frequency,

c) repeating the step b) a number of times while varying the direction of the gradient of the gradient field and/or the phase difference between the mechanical oscillations and the gradient field in order to form further phase images,

d) determining the amplitude of the excursion of the spins at the fundamental frequency on the basis of the MR phase images,

e) determining the amplitude of the excursion of the spins at the higher harmonics of the fundamental frequency on the basis of the MR phase images, and

f) forming an image which is dependent on the ratio of the <u>higher harmonic and fundamental frequency</u> amplitudes.

4. (Currently Amended) A method as claimed in claim 3, in which the magnetic gradient field (G1, G2) comprises two separate, sinusoidal <u>gradient field</u> oscillations having half the period duration of the mechanical oscillations, the distance in time between said <u>gradient field</u> oscillations amounting to one quarter of the period duration of the mechanical oscillations.

5. (Currently Amended) A method as claimed in claim 4, in which a refocusing RF pulse acts on the examination zone between the two sinusoidal <u>gradient field</u> oscillations.

6. (Original) A method as claimed in claim 3, which method includes the steps of:

a) additionally calculating the elasticity in the examination zone, and

b) evaluating the values of distortions and elasticity determined for the same voxel.

7. (Original) An arrangement for carrying out the method claimed in claim 1 by means of an MR apparatus, a mechanical oscillation generator, an evaluation unit, a generator which determines the variation in time of magnetic gradient fields, and a control unit which controls the MR apparatus, the generator, the oscillator and the evaluation unit and is programmed in such a manner that the following steps are carried out:

a) exciting the object by means of temporally periodically, preferably sinusoidally varying mechanical oscillations,

b) exciting the nuclear magnetization in the object in conjunction with a magnetic gradient field (G1, G2) which is synchronous with the mechanical oscillations, and receiving the MR signals arising in the object in order to form an MR phase image, the variation in time of the gradient field being chosen to be such that the MR signals are determined by excursions at the fundamental frequency as well as by excursions at at least one higher harmonic of the fundamental frequency,

c) repeating the step b) a number of times while varying the direction of the gradient of the gradient field and/or the phase difference between the mechanical oscillations and the gradient field in order to form further phase images,

d) determining the amplitude of the excursion of the spins at the fundamental frequency on the basis of the MR phase images,

e) determining the amplitude of the excursion of the spins at the higher harmonics of the fundamental frequency on the basis of the MR phase images, and

f) forming an image which is dependent on the ratio of the amplitudes.

8. (Currently Amended) A computer program for a control unit which acts on an MR apparatus, an oscillation generator and an evaluation unit in order to carry out ~~the~~ a method ~~as claimed in claim 1~~ as follows:

a) exciting the object by means of temporally periodically, preferably sinusoidally, varying mechanical oscillations,

b) exciting the nuclear magnetization in the object in conjunction with a magnetic gradient field (G1, G2) which is synchronous with the mechanical oscillations, and receiving the MR signals arising in the object in order to form an MR

phase image, the variation in time of the gradient field being chosen to be such that the MR signals are determined by excursions at the fundamental frequency as well as by excursions at at least one higher <u>order</u> harmonic of the fundamental frequency,

c) repeating the step b) a number of times while varying the direction of the gradient of the gradient field and/or the phase difference between the mechanical oscillations and the gradient field in order to form further <u>MR</u> phase images,

d) determining the amplitude of the excursion of the spins at the fundamental frequency on the basis of the MR phase images,

e) determining the amplitude of the deflection of the spins at the higher harmonics of the fundamental frequency on the basis of the MR phase images, and

f) forming an image which is dependent on the ratio of the amplitude[[s]] <u>of the at least one higher order harmonic and the amplitude of the fundamental frequency</u>.

9. (New) A computer media programmed to control an MR apparatus to perform the method as claimed in claim 1.

10. (New) A method as claimed in claim 1, wherein determining the non-linear distortions includes determining a non-linearity coefficient α of Youngs modulus E as expressed by the formula:

$$E = E_0 e^{\alpha \varepsilon}$$

where E_0 is an initial elasticity and where ε denotes deformation, such that stiffness increases exponentially with increasing deformation.

11. (New) A method as claimed in claim 10 further including determining E_0 from the measured variation in time of the excursion.

12. (New) A method as claimed in claim 1 wherein determining the non-linear distortions includes:

estimating elasatic non-linearity from the measured variations in time of the excursions; and

applying a Fourier transform to yield a fundamental frequency amplitude and at least one higher frequency amplitude.

13. (New) A method as claimed in claim 1 wherein determining the non-linear distortions includes:

determining excursion amplitudes at a fundamental frequency and at least at one higher order frequency.

14. (New) A method as claimed in claim 13 further including:

determining a ratio of the amplitude at the fundamental frequency to the amplitude at the at least one higher order frequency.